

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/000439

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04L25/03 H04L27/26 H04B3/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04L H03H H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	IHALAINEN T; HIDALGO-STITZ T; RENFORS M: "On the Performance of Low-Complexity ASCET-Equalizer for a Complex Transmultiplexer in Wireless Mobile Channel" 7TH INTERNATIONAL OFDM WORKSHOP 2002, 11 September 2002 (2002-09-11), XP002299814 HAMBURG, GERMANY cited in the application the whole document	1,2,5,6, 11-16, 19,20, 25-30, 33,34, 39-43
A	----- -/--	7,9,21, 23,35,37

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

2 September 2005

Date of mailing of the international search report

09.09.2005

Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

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PCT/IB2004/000439

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 555 285 A (TAPIA JAVIER J ET AL) 10 September 1996 (1996-09-10)  column 3, line 51 - line 61 column 14, line 9 - line 45 column 23, line 50 - column 27, line 29	1,2,5-7, 11-16, 19-21, 25-30, 33-35, 39-43
A	-----	9,23,37
X	US 2004/008618 A1 (HAYASHINO HIROSHI ET AL) 15 January 2004 (2004-01-15)  paragraph [0006] paragraph [0021] - paragraph [0022] paragraph [0090] - paragraph [0096] paragraph [0108] - paragraph [0112] paragraph [0122] paragraph [0135] figure 1	1,5,15, 19,29, 33,43
A	-----	7,9,12, 21,23, 26,35, 37,40
X	US 2003/067997 A1 (KELLER MARK V ET AL) 10 April 2003 (2003-04-10)  paragraphs [0001] - [0003] paragraph [0011] paragraph [0026] - paragraph [0032] -----	1,8,10, 22,24, 36,38
A	NEZAMI M K ED - INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS: "Techniques for acquiring and tracking MIL-STD 181B signals" MILITARY COMMUNICATIONS CONFERENCE. MILCOM 2002. PROCEEDINGS. ANAHEIM, CA, OCT. 7 - 10, 2002, IEEE MILITARY COMMUNICATIONS CONFERENCE, NEW YORK, NY : IEEE, US, vol. VOL. 1 OF 2, 7 October 2002 (2002-10-07), pages 224-231, XP010632104 ISBN: 0-7803-7625-0 page 225, right-hand column, Section "Preamble DFT-Based Acquisition" - page 226, left-hand column, two lines after equation (4)  ----- -/--	5,7,9, 19,21, 23,33, 35,37

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International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>BOLDING G ET AL: "A COMPUTATIONALLY EFFICIENT METHOD OF TIMING AND PHASE ESTIMATION IN TDMA SYSTEMS USING A PREAMBLE SEQUENCE"</p> <p>INTERNATIONAL JOURNAL OF SATELLITE COMMUNICATIONS, JOHN WILEY AND SONS, US, vol. 13, no. 6, November 1995 (1995-11), pages 441-452, XP000979620</p> <p>ISSN: 0737-2884</p> <p>page 442, right-hand column, Section 3 -</p> <p>page 444, left-hand column, Section 4</p> <p>-----</p>	<p>5,7,9,</p> <p>19,21,</p> <p>23,33,</p> <p>35,37</p>

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International application No.  
PCT/IB2004/000439

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 3, 4, 17, 18, 31, 32  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☒ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 3, 4, 17, 18, 31, 32

According to claims 3, 17, 31 the number of frequency points is selected to correspond to the minimum number which can be expected to result in a sufficient channel estimation. In order to carry out the invention, the person skilled in the art thus would have to carry out a minimization problem according to a well-defined criterium in order to compute the minimum number of frequency points. The description, however does not disclose any details concerning such a minimization problem. The only information that is given in the description in addition to the definition of claims 3, 17, and 31 is that the minimization is carried out data block wise based on the determined frequency domain channel estimates. How this minimization is carried out based on the channel estimates is not disclosed, however. The disclosure therefore lacks the precise technical features which would render it apparent to the skilled person how to select the minimum number of frequency points. Consequently, claims 3, 17, and 31 do not comply with the requirements of Article 5 PCT.

The teaching of claims 4, 18, and 32 does not go beyond what is disclosed in the description in that they merely specify that the minimization is carried out data block wise based on the determined frequency domain channel estimates. Consequently, claims 4, 18, and 32 do not comply with the requirements of Article 5 PCT, either.

Since neither the description nor the Figures disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, they are considered so unclear that no meaningful search can be carried out with respect to claims 3, 4, 17, 18, 31, and 32 (Articles 5 and 17(2)(a)(ii) PCT).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 2, 5-7, 9, 11-16, 19-21, 23, 25-30, 33-35, 37, 39-43

Phase equalizer

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2. claims: 8, 10, 22, 24, 36, 38

Amplitude equalizer

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/000439

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5555285	A	10-09-1996	NONE
US 2004008618	A1	15-01-2004	EP 0961448 A2 01-12-1999 JP 2000049747 A 18-02-2000 US 6618352 B1 09-09-2003
US 2003067997	A1	10-04-2003	NONE